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BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

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SUBJECT--

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REPORT OF PINE BEETLE SURVEYS ON THE SNOQUALMIE NATIONAL FOREST, WASHINGTON SUMMERS OF 1940 AND 1941

By

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February 27, 1942

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REPORT OF PINE BEETLE SURVEYS ON THE SNOQUALMIE NATIONAL FOREST, WASHINGTON SUMMERS OF 1940 AND 1941

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INTRODUCTION

The eighth and ninth pine beetle surveys in portions of the ponderosa pine stands of the Snoqualmie National Forest, Washington, east of the Cascade Mountains, were completed during the periods of August 17-21, 1940 and November 4-7, 1941 respectively. These surveys, part of a regional cooperative project between the Forest Service, Indian Service, and Bureau of Entomology and Plant Quarantine, have the following three objectives: (1) To follow the infestation trends of forest insects, particularly those of the western pine beetle (Dendroctonus brevicomis Lec.); (2) to locate the areas of epidemic infestation warranting direct control measures; and (3) to define the types of trees and areas most susceptible to insect attack which should be considered in forest management plans.

Two types of surveys were conducted. Intensive surveys were made on four 320-acre check plots (see table I) by three-man crews composed of the following men:

1940 crew - R. M. Ramstad, J. E. Weaver, and G. G. Black

1941 crew - F. E. Kinney, O. W. Summerside, and H. A. Dahl

Extensive, or observational, surveys were made over most of the 270,000 acres of commercial pine by the writer on August 11-12, 1940 but not in 1941. From these combined surveys, estimates of the insect-caused ponderosa pine losses for the forest as a whole were prepared.

RESULTS OF THE 1941 SURVEY

A summary of the 1941 check plot cruising data will be found in table II. This survey was made at a time when approximately 84 percent (Grant's curve) of the probable losses for the year were marked by the crew. On three of the four plots the estimated volume losses for 1941 are higher than those of 1940, while the estimated number of trees killed in 1941 was higher on only two plots. Considering the plots as a group, the estimated average volume losses are 31 percent higher than those of 1940 and the number of trees is only slightly lower than the figure for 1940. As in other years, the Tieton plot continued to show the highest losses.

Most of these losses are attributable to the western pine beetle with a small percentage of the total loss credited to the mountain pine beetle (Dendroctonus monticolae Hopk.) and to the California pine flathead (Melanophila californica VD.). No direct control measures seem necessary at this time, although the situation needs close checking next year.

RECENT LOSSES

A record of insect-caused losses on the Snoqualmie National Forest prior to 1939 will be found in two reports by the writer. These reports bear the same titles as the present report but are dated January 1939 and March 1940.

Table III presents a summary of the ponderosa pine losses on the virgin stands for the three-year period 1938-1940 inclusive. Since the low of 1937, insect-caused losses on the four plots as a group have increased each year, but on the individual plots the trend of the losses has fluctuated annually. During this period an average of 58 board feet per acre per year and .48 percent of the stand per year have been killed on the four plots. While these losses have been increasing, they are still considered as representing a light epidemic infestation, and, for the most part, have probably been offset by annual growth.

GENERAL FOREST CONDITIONS

As a result of the combined surveys, estimates of the insect-caused losses for the forest as a whole have been made. The estimated losses for 1939 and 1940 are given by infestation areas in table IV and the 1940 condition is shown graphically by figure I. The general estimates are based on the check plot trends and are tempered by observational surveys and the amount of cutting that has taken place in the infestation areas.

Although these surveys have uncovered no units of the Snoqualmie National Forest needing urgent attention from the standpoint of timber salvage, consideration should be given to the removal of all beetle susceptible timber in present or in contemplated timber sales. The Forest Insect Laboratory at Portland, Oregon, would be available for cooperative assistance to delineate types of trees and areas needing attention from a timber salvage or sanitation salvage logging standpoint.

RECOMMENDATIONS

If possible another survey of the check plots and the forest as a whole should be made in 1942. The data secured from these surveys become increasingly valuable with each year's survey and it is highly desirable to continue these loss records. Wherever possible, attention should be given to the removal of trees susceptible to insect attack and to areas containing large amounts of over-mature timber in which cutting operations should be first directed.

SUMMARY

A brief review of pine beetle surveys for the summers of 1940 and 1941 in the ponderosa pine stands of the Snoqualmie National Forest, Washington, is presented. Nearly all of the ponderosa pine mortality on this forest is the result of attacks by the western pine beetle. These losses have been persistent but not serious.

Since the low of 1937, the losses on the four check plots as a group have increased annually.

The estimated volume losses for 1941 show an increase of 31 percent over the 1940 losses but the number of trees is slightly lower than the 1940 total.

No direct control measures are necessary at this time.

Table I. Description of the survey check plots, Snoqualmie National Forest, Washington

Infestation division		Check plots							Acres		Ponderosa pine (board feet)	
			Location			Elev.		Site		Pine	As of Jan.	
Area	Unit	Name	T.	R.	Sec.	(feet)	Type*	quality	Total	timbered	1, 1940	Per acre
Toppenish	Ahtanum	Soda Springs	12N	14E	12E/2	3,000-4,800	20.5 (5½)	V	320	300	2,710,000	9,000
Naches	Tieton	Tieton	14N	14E	34E/2	3,000-3,800	20.5	III-	320	305	5,080,000	16,600
	Wenas	Rattlesnake Creek	15N	14E	16S/2	3,600	20.5	IV+	320	300	4,680,000	15,600
		Bald Mt.	17N	16E	29E/2	3,000-4,000	20.5 (5½)	IV	320	300	2,510,000	8,400

*Forest survey type designations

Table II. Summary of ponderosa pine check plot losses, Snoqualmie National Forest (Summer survey of 1941)

	1940 losses			1941 losses							
	Trees				Partial loss		Predicted total loss				
Check plot	First cruise	Total	Volume (bd.ft.)	Date of cruise	Trees	Volume (bd.ft.)	Trees	Volume (bd.ft.)	Per acre	% of stand	Ratio to 1940
Soda Springs	21	58	27,580	11/7/41	31	16,150	37	19,000	63	.59	.58
Tieton	18	47	29,040	11/4/41	61	43,670	72	52,000	170	1.03	1.79
Rattlesnake	7	14	7,650	11/5/41	14	9,810	17	12,000	40	.26	1.57
Bald Mt.	30	57	21,710	11/6/41	39	24,880	46	29,000	97	1.15	1.34
Total	76	176	85,980		145	94,510	172	112,000	92	.75	1.31

Table III. Summary of recent ponderosa pine losses on permanent check plots Snoqualmie National Forest, Washington

Check plot	1938 loss: Trees	1938 loss: Volume: Total	1938 loss: Volume: Per acre	1938 loss: Volume: % of stand	1938 loss: Ratio to 1937	1939 loss: Trees	1939 loss: Volume: Total	1939 loss: Volume: Per acre	1939 loss: Volume: % of stand	1939 loss: Ratio to 1938	1940 loss: Trees	1940 loss: Volume: Total	1940 loss: Volume: Per acre	1940 loss: Volume: % of stand	1940 loss: Ratio to 1939
Soda Springs	15	14,070	49	.52	2.90	19	11,490	36	.42	.82	58	27,580	92	1.01	2.46
Tieton	20	18,320	60	.37	.69	56	29,730	93	.58	1.62	47	29,040	95	.57	.98
Rattlesnake Creek	15	8,820	29	.19	—	25	10,580	33	.23	1.20	14	7,650	25	.16	.72
Bald Mt.	22	16,230	54	.64	8.20	30	14,810	46	.59	.91	57	21,710	72	.87	1.46
Total	72	57,460	48	.38	1.51	130	66,610	55	.45	1.16	176	85,980	71	.57	1.29

Table IV. Estimated 1939 and 1940 ponderosa pine insect-caused depletion Snoqualmie National Forest

Infestation area	Ponderosa pine: Acres	Ponderosa pine: Volume (M.bd.ft.)	1939 losses: Trees	1939 losses: Volume: M.bd.ft.	1939 losses: Volume: Per acre	1939 losses: Volume: % of stand	1940 losses: Trees	1940 losses: Volume: M.bd.ft.	1940 losses: Volume: Per acre	1940 losses: Volume: % of stand
Naches	233,200	1,670,000	13,600	7,000	30	.42	14,000	8,000	34	.48
Toppenish (Ahtanum Unit)	38,000	291,000	1,400	1,400	37	.48	2,000	2,000	52	.69
FOREST TOTAL	271,200	1,961,000	15,000	8,400	31	.44	16,000	10,000	37	.51

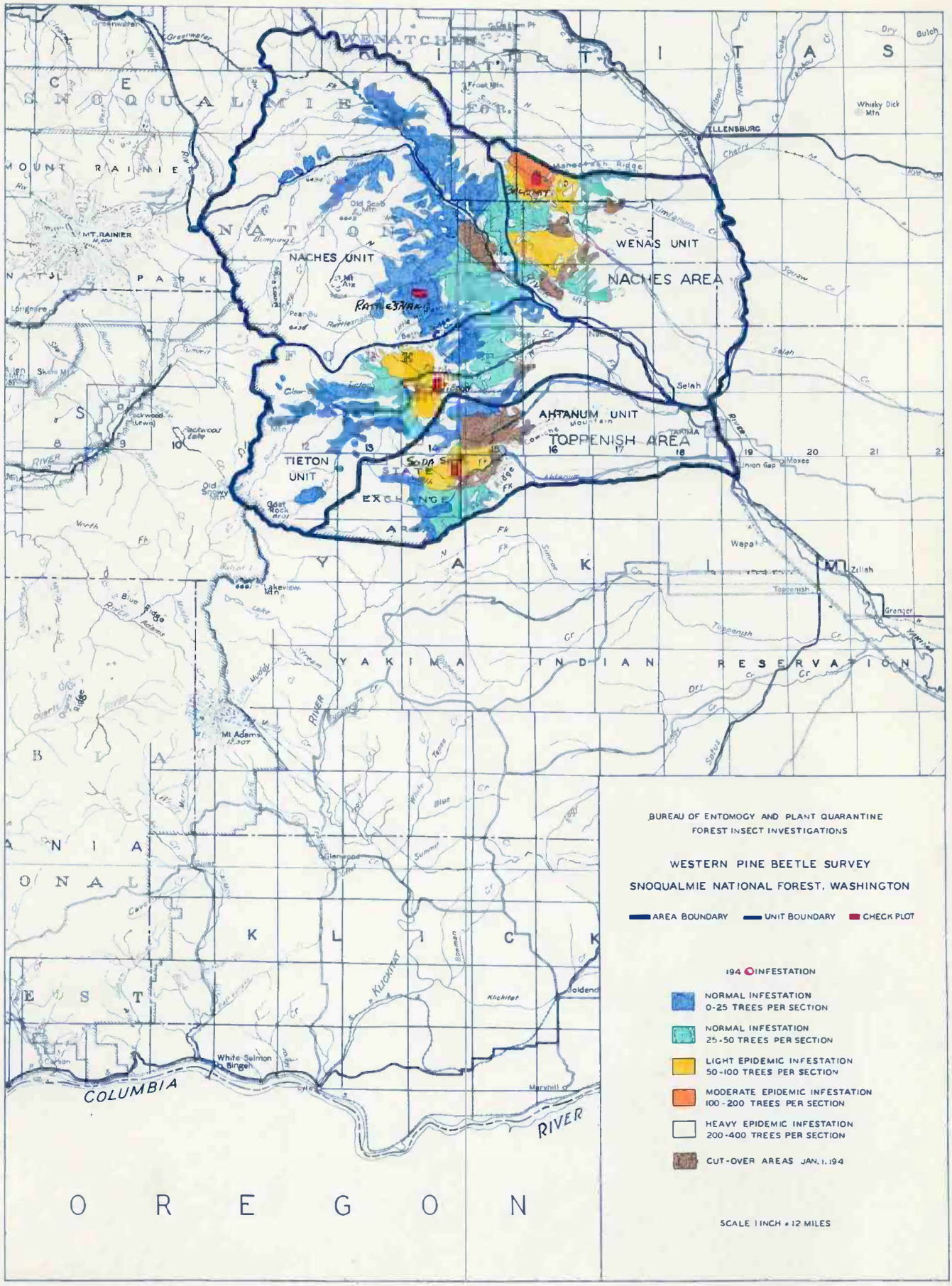
BUREAU OF ENTOMOGY AND PLANT QUARANTINE
FOREST INSECT INVESTIGATIONS
WESTERN PINE BEETLE SURVEY
SNOQUALMIE NATIONAL FOREST, WASHINGTON
AREA BOUNDARY
UNIT BOUNDARY
CHECK PLOT
194 INFESTATION
NORMAL INFESTATION
0-25 TREES PER SECTION
NORMAL INFESTATION
25-50 TREES PER SECTION
LIGHT EPIDEMIC INFESTATION
50-100 TREES PER SECTION
MODERATE EPIDEMIC INFESTATION
100-200 TREES PER SECTION
HEAVY EPIDEMIC INFESTATION
200-400 TREES PER SECTION
CUT-OVER AREAS JAN. 1, 194
SCALE 1 INCH = 12 MILES
NACHES UNIT
WENAS UNIT
NACHES AREA
AHTANUM UNIT
TOPPENISH AREA
TIETON UNIT
YAKIMA INDIAN RESERVATION
MOUNT RAINIER
MT. RAINIER
SNOQUALMIE
WENATCHEE
ELLENSBURG
COLUMBIA RIVER
OREGON

FIGURE I